e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:06/June-2022 Impact Factor- 6.752 www.irjmets.com

DIABETES DETECTION BASED ON IRIS ABNORMAL

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ABSTRACT

Iris image analysis is one of the most effective non-invasive diagnosis methods for determining the health condition of organs in clinical diagnosis. Though accurate and quick diagnosis is vital, it is an absolutely necessary requirement of medical science. According to the literature review, several modern technologies also fail to appropriately identify disease. This endeavor investigates the field of diagnosis from several angles. Irido diagnosis is an area of medical science that can be used to detect a variety of disorders. Initially, photos of the eyes are recorded, a database with their clinical history is formed, features are identified, and lastly, a classification is made to determine whether or not a diabetic is present. Here For training and classification, a machine learning KNN (K-nearest neighbors) model is used.

Keywords: Diabetics**,** Machine Learning Iridology, KNN Model.

I. INTRODUCTION

Authentication of an individual using biometric system based on human biometric system based on human characteristics such as face, finger, voice and iris has always been an interesting area of research. Among these, iris recognition system is considered to be the most accurate and reliable biometric system is mainly employed in various security systems such as at airports, laboratories, ATM machines, etc. Iris recognition system can also be used for clinical applications. A large number of researchers have utilized iris recognition algorithms along with iridology to determine the status of the health of an individual. Iridology, referred to as iris diagnosis, is an alternate medicine technique through which colors, patterns, and characteristics of iris can be used to gather the information regarding the status of health of an individual. In this project, gray level co-occurrence matrix for feature extraction and K-nearest neighbour (KNN) as a classifier-based iris recognition system has been proposed to determine diabetes.

II. METHODOLOGY

Image acquisition, Iris image segmentation, Iris image normalization, Liver Part Extraction, Feature extraction, Feature classification.

1. Classification of features.

Iris image acquisition: Image acquisition in image processing can be broadly defined as the action of retrieving an image from some source, usually a hardware-based source, so it can be passed through whatever processes need to occur afterward.

Performing image acquisition in image processing is always the first step in the workflow sequence because, without an image, no processing is possible. The image that is acquired is completely unprocessed and is the result of whatever hardware was used to generate it, which can be very important in some fields to have a consistent baseline from which to work.

2. Iris image segmentation:

After image acquisition, DCT transform is applied to iris image. Next, a segmentation algorithm is used, which would localise the iris region from an eye image and isolate eyelid, eyelash and reflection areas. Automatic segmentation is achieved using the circular Hough transform for localising the iris and pupil regions, and the linear Hough transform for localising occluding eyelids. Thresholding is also employed for isolating eyelashes and reflections.

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3. Iris image normalization:

The segmented iris region is normalised to eliminate dimensional inconsistencies between iris regions. This is achieved by implementing a version of Daugman's rubber sheet model, where the iris is modelled as a flexible rubber sheet, which is unwrapped into a rectangular block with constant polar dimensions. It's important to have a representative example of everyone because everyone's iris orientation differs. Circular iris patterns must be normalized into rectangular forms. For the iris standardization procedure, Daugman's rubber sheet model is used. The circular iris area is transformed into a pair of polar coordinates (r, θ), where r is in the range and is in the interval. In order to normalize the iris region, Daugman's rubber sheet model is used. The pupil centre is taken into consideration as the centre, and radial vectors are transmitted across the iris region. The radial resolution is reflected by a range of information points that are chosen on any radial line. The angular resolution is emphasized by the diversity of radial lines encircling the iris field. The normalized iris area is obtained, and the region is then unwrapped by choosing a consistent number of points along each radial line and creating a 2D array with vertical radial resolution and horizontal angular resolution. Another 2D array is created for labelling eyelashes in order to prevent non-iris region information, and any eyelids that are discovered during the segmentation process are disregarded.

4. Liver Part Extraction:

This programme divides the normalized iris picture into six sections. Based on an iris chart, the liver is recognized as the fourth portion of that. The sole discovered liver component is retrieved for further processing once the liver part has been identified using a thresholding procedure.

5. Feature extraction:

The performance of one or many metrics makes up the characteristic. In a grayscale picture, it describes the relationship between two nearby pixels. Both the first and second picture elements are referred to as the reference and neighboring picture elements, respectively. It talks about how often one grey level would appear in a very tenuous association with another grey level. The matrix is modified to accommodate both the angle and the space between pixels. Unit energy, contrast, correlation, homogeneity, and energy are features that are extracted.

Energy = $\sqrt{\Sigma i,j=0\ G-1\ (M(i,j))\ 2}$

Homogeneity = $\Sigma i,j=0\ G-1\ M(i,j)\ 1 + (i + j)\ 2$

Correlation = $\Sigma i,j=0\ G-1\ M(i,j)\ [\ (i - i)(j - j)\ \sqrt{(\sigma i\ 2\ )(\sigma j\ 2\ )}\ ]$

Energy = $\Sigma i,j=0\ G-1\ M(i,j) \times (i,j)\ 2$

Entropy = $-\Sigma b=0\ G-1 P(b) log2\{P(b)\}$

6. Feature classification:

One of the simplest machine learning algorithms, based on the supervised learning method, is K-Nearest Neighbor. The K-NN method makes the assumption that the new case and the existing cases are comparable, and it places the new instance in the category that is most like the existing categories. A new data point is classified using the K-NN algorithm based on similarity after all the existing data has been stored. This means that utilizing the K-NN method, fresh data may be quickly and accurately sorted into a suitable category. Although the K-NN approach is most frequently employed for classification issues, it may also be utilized for regression. Since K-NN is a non-parametric technique, it makes no assumptions about the underlying data. It is also known as a lazy learner algorithm since it saves the training dataset rather than learning from it immediately. Instead, it uses the dataset to execute an action when classifying data. The KNN method simply saves the dataset during the training phase and then classifies incoming data into a category that is very close to the previously stored dataset.

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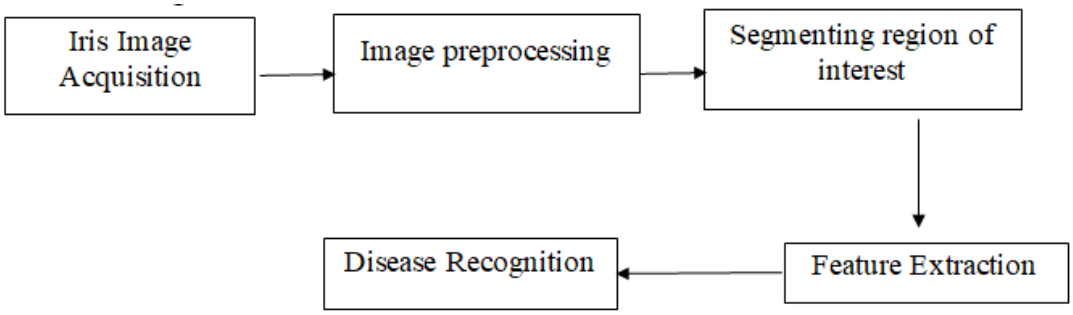
Block Diagram



III. EXPERIMENTAL RESULT

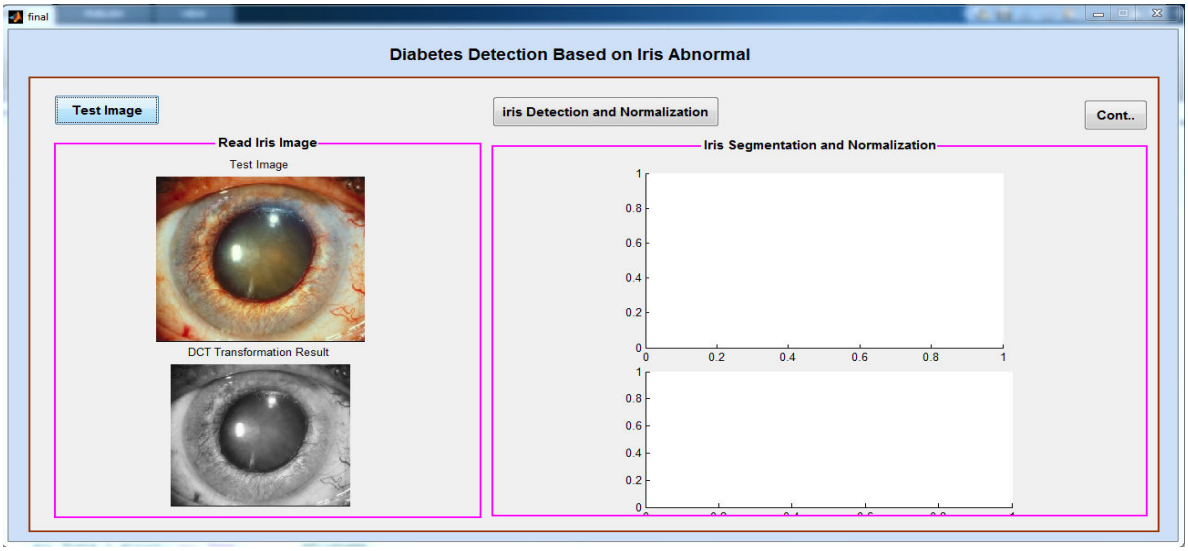


Fig 1: Iris detection

An Eye image is acquired to detect the diabetes is present or not by applying image processing and machine learning techniques. Firstly, in this image detection the image is converted to gray color using I=rgb2gray (RGB) command in matlab. Then image is compressed by using Discrete Cosine Transform.

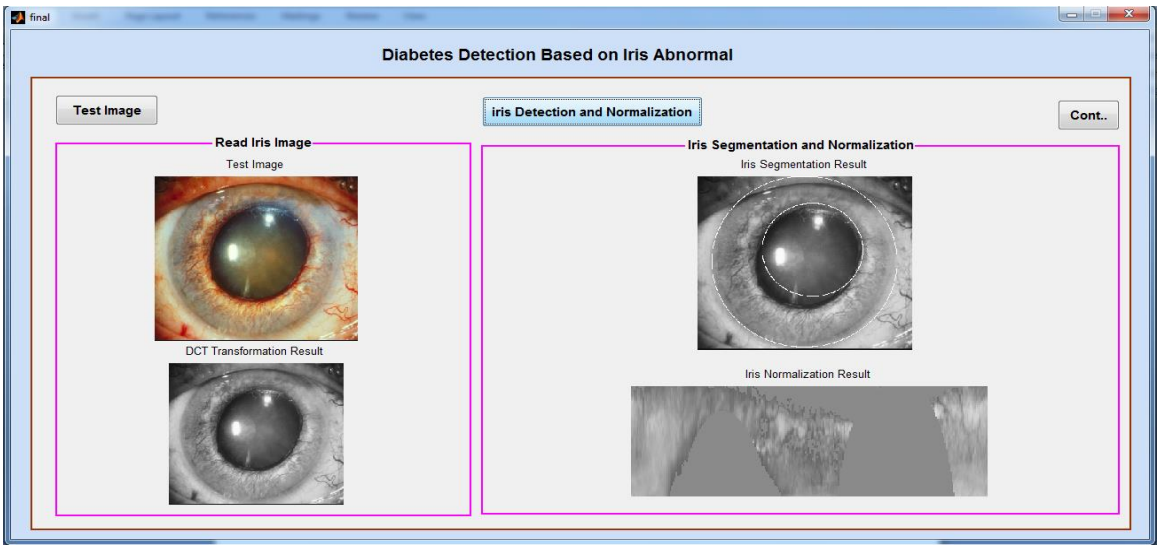


Fig 2: Iris segmentation & Normalization

The Compressed image is segmented to detect the iris and pupil reason. This segmentation is done by hough transform which localizes the iris region and occludes the eye lids and then the segmented image is normalized to eliminate dimensional inconsistencies between iris regions.

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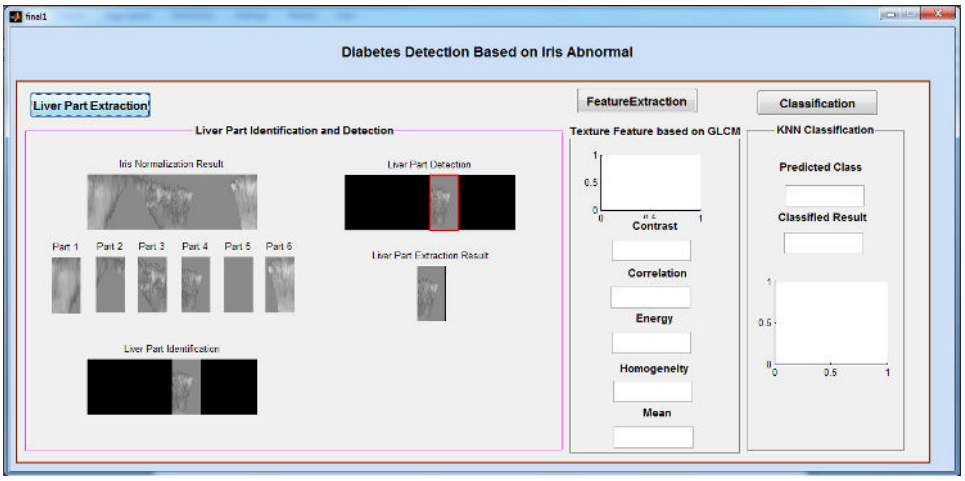

Fig 3: Liver Part Identification

The Liver part is extracted from the normalized iris image by thresholding method using iris chart. According to the Iridology Chart Liver is represented between 38'- 42' of second major zone in the right Iris.

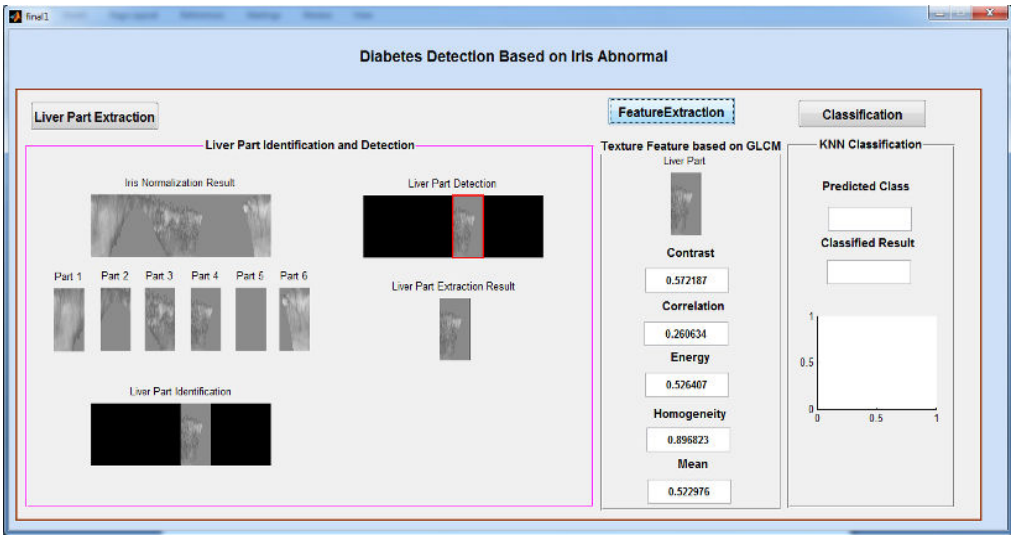

Fig 4: Feature Extraction

From the extracted liver part, the texture features like contrast, correlation, energy, Homogenity, Mean are extracted using grey level cooccurrence matrix which considers the spatial relationship of pixels.

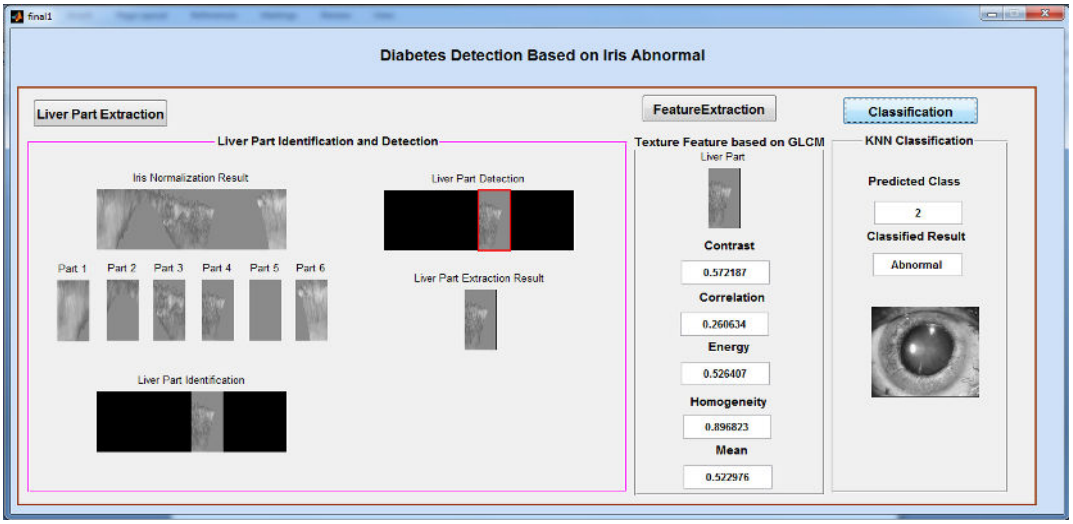

Fig 5: Classification

In classification, the calculated feature values of tested image are compared with the existed feature values in the data base by KNN algorithm and then classifies the results.

IV. CONCLUSION

For the detection of diabetics using iris images, a novel framework has been built. Enhancement is necessary for the extraction of deep layer features for clinical feature analysis. One eye picture is captured and kept in the project's database. Apply the DCT transform, then segment and normalize the iris using the hough transform model to extract the only iris area, and the daugman rubber sheet model to normalize the iris. Later, using an iris chart and a normalized iris picture, the liver portion is removed. Then it extracts textural characteristics like mean, contrast, energy, and correlation. Finally, the test image is classified as normal or abnormal using the machine learning model KNN algorithm

V. REFERENCES

[1] Atul Bansal, Ravinder Agarwal, R.K. Sharma, "Determining diabetes using iris recognition system", 2015.

[2] Dr, Prakash H. Patil, Roshan M. patil, Nidhi H. Manek, Harsha V. Ladda," Smart Lab Detection for Diabetic Patient using Iris Image" , 2018.

[3] Shreeja A, Ms. R Monika,,Lolla BNV Sai Rama Pradeep, N Vamsi Sandeep, D HamsaVardhan IoT Based Diabetes Detection through Iris Image Analysis, 2021

[4] Doss, S., Paranthaman, J., Gopalakrishnan, S., Duraisamy, A., Pal, S., Duraisamy, B., ... & Le, D. N. (2021). Memetic Optimization with Cryptographic Encryption for Secure Medical Data Transmission in IoT-Based Distributed Systems. CMC-COMPUTERS MATERIALS & CONTINUA, 66(2), 1577-1594.

[5] Prasad, J., Patel, D., Jadhav, M., & Deshmukh, R. (2016). IRIS BASED MEDICAL ANALYSIS BY GEOMETRIC DEFORMATION.

[6] Chaskar, U. M., & Sutaone, M. S. (2012, January). On a methodology for detecting diabetic presence from iris image analysis. In 2012 International Conference on Power, Signals, Controls and Computation (pp. 1-6). IEEE.

[7] Tathe, M. P. B., & Patil, M. D. M. (2015). Analysis of health condition based on iris image. International Journal of Innovation in Engineering, Research and Technology [IJIERT], 2015(1), 1-4.

[8] Padmasini, N., Umamaheswari, R., Kalpana, R., & Sikkandar, M. Y. (2020). Comparative study of iris and retinal images for early detection of diabetic mellitus. Journal of Medical Imaging and Health Informatics, 10(2), 316-325.

[9] Padmasini, N., Umamaheswari, R., Kalpana, R., & Sikkandar, M. Y. (2020). Comparative study of iris and retinal images for early detection of diabetic mellitus. Journal of Medical Imaging and Health Informatics, 10(2), 316-325.

[10] Aminah, R., & Saputro, A. H. (2019, September). Diabetes prediction system based on iridology using machine learning. In 2019 6th International Conference on Information Technology, Computer and Electrical Engineering (ICITACEE) (pp. 1-6). IEEE.